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ABSTRACT

Longitudinal support was obtained for a positive relationship between cognitive and social development. From a large sample of kindergarteners, three groups of 12 children of comparable age and IQ were selected as displaying substantial, moderate, or no mastery of Piagetian concrete operations. From kindergarten through second grade, the social development of the initially high cognitive group exceeded that of the initially low cognitive group in the areas of empathy, communication and role taking. Although all groups improved, cognitive differences present in kindergarten persisted through second grade. (Author/JMB)

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A Longitudinal Study of the Relationship Between Cognitive and Social Development[1]

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Presently we seem to be witnessing a third generation of studies in reaction to Piaget's theory of cognitive development. After the rediscovery of Piaget by U. S. psychologists in the early 1960's, we witnessed a long series of replication studies. Following these replication studies, which were mostly successful, there emerged a somewhat smaller quantity of training studies in the late 1960's and early 1970's. As a whole, these studies were largely unsuccessful in inducing anything but minimal change. Perhaps the results of the replication and training studies have been taken as providing substantial enough support for Piaget's theory that investigators are currently interpreting age differences in various areas of development as reflecting changes in cognitive development. The attribution to cognitive development of a casual role in the development of other processes is quite consistent with Piaget's own thinking (1950).

Within the board area of social development, on the relationship between cognitive and moral development has received much empirical attention. Several studies have been able to document a relationship between the two processes (see Keasey 1975, for a review). The only other area of social development to receive much attention has been role-taking. Here the relationship doesn't seem to be nearly as strong as that between cognitive and moral development. It is also unclear what particular logical abilities are related to role-taking (see Shantz, 1975, for a review). We are left, then, with a large number of studies of social development that attribute a casual role to cognitive development but do not directly assess it. Some of these studies (Blanchard & Price, 1971; Devries, 1970; Smith, 1975; Shultz, Butkowsky, Pearce, & Shanfield, 1975) indirectly assess cognitive development by selecting children at particular ages or levels of IQ. However, neither of these two approaches is at all appropriate. The inadequacy of an IQ score as an index of cognitive development has been discussed by Keasey (1975). Although there is some overlap in the mental capacities assessed by IQ tests and Piagetian measures, the nonoverlap is much more substantial (Devries, 1974). Because of the many correlates of age in addition to cognitive development, it is difficult to attribute age differences to cognitive development and ignore the many other possible factors. Furthermore,most of the studies which indirectly assess cognitive development by selecting children at particular ages employ no actual measures of cognitive development.

In view of all of the above drawbacks, it appears that an appropriate test of the relationship between cognitive and social development would require that Piagetian cognitive developmental tasks be used rather than IQ measures and that age be held constant. Furthermore, since there is no guarantee that the relationship between the two processes will be constant across different age groups, several ages should be sampled. In addition to the above design features, the present study employed a longitudinal rather than a cross-sectional design because of the advantages it has in examining the relationship between two developmental processes.

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The transition from preoperational to concrete operational thinking was focused on since it represents the major cognitive change evidenced by young children. Children evidencing concrete operational thinking were compared to children of the same age (late kindergarten) who were either still preoperational or who were in the transition to concrete operational thinking. It was hypothesized that concrete operational children would evidence more advanced social development in several areas. It was further assumed that the transitional children would evidence no less social development than the preoperational children nor more advanced social development than the concrete operational children. The stability of these predicted differences was examined one and two years later.

METHOD

Subjects

45 children were selected from a larger sample of 88 kindergarteners on the basis of their performance on three Piagetian measures of concrete operational thinking. These 45 children were selected so as to form three groups (n=15) evidencing either high, moderate, or no mastery of concrete operations. These three groups were also selected in such a way that they did not differ with respect to age or estimated IQ (based on performance on the Metropolitan Readiness Test). All children were caucasian, of average intelligence, and from predominantly lower middle class homes.

Procedure

All children were individually administered Piagetian measures of classification and conservation. This phase of the study took approximately one month. The four different measures of social development were only administered to the 45 children selected from the larger sample. Again this second phase of the testing took approximately one month. The same set of tasks was administered to the three groups of children toward the end of kindergarten and first and second grade. Each year the administration of social tasks followed that of the cognitive tasks by about one month. Different testers were involved each year.

Measures

Cognitive development was assessed by means of Piagetian tasks designed to measure classification and conservation of mass and weight. A set of wooden blocks which varied in both color and shape were used to assess four different levels of classificatory ability. Simple sorting was assessed by asking children to put together blocks that were the same (color or shape). Resorting was reflected by the ability to arrange the blocks according to the dimension not used in the first sort. Two different procedures were used to assess class inclusion. One resembled Piaget's "impossible" task of sorting red and blue wooden beads into two piles - one of all the blue beads and one of all the wooden beads. The other was Kofsky's (1966) task in which children are asked if there are more reds, blues, squares, or triangles in a set of blocks in which each block belongs to two classes at the same time. The fifth task assessed hierarchical classification by asking children whether

there were more cats, dogs, or animals in various arrays of cards showing either a cat or a dog (Ahr & Youniss, 1970) Kofsky's (1966) task was scored from 0 to 1, all others were scored as 0 or 1. Consequently children's classification scores could vary from 0 to 6.

Conservation of mass and weight were assessed by means of the procedures used by Elkind (1961). After children had decided that two balls of clay were equal in mass or weight, one of the balls was successively transformed into sausages of 2', 4', 8', and 16'. In the fifth transformation, the sausage was broken into approximately one dozen pieces. Children's responses to the equality question (i.e., now does the hot dog have more, less, or the same amount of clay as the ball) were scored according to a six point scale devised by Feffer. Low scores reflect the centration of onconservers (e.g., the hot dog has more clay because it is longer) and the high scores reflect conservation (e.g., the hot dog still has the same amount because you have not added any). Children's scores on each conservation task could range from 5 to 30.

Four tasks were employed to assess the child's social development in three different realms; empathy, role-taking, and communication. Borke's (1971) task of selecting different faces (sad, happy, etc.) for eleven affect-arousing situations was used to measure empathy. Because of various criticisms of this task (Chandler & Greenspan, 1972), a second measure of empathy, which satisfies these criticisms was developed. It, too, involved eleven affect-arousing situations, but required the child to deal with both his own and another child's perspective. Children's communication ability was assessed by means of a task in which one child describes a novel design to a second child who must then select it from an array of several designs (Glucksberg, Krauss, & Weisberg, 1966). Each pari of children were given three trials of the task which involves six novel designs. Their score represents the number of correct matchs out of 18. DeVries's (1970) task in which children guess which hand a penny has been hidden in, was used to assess role-taking ability.

RESULTS AND DISCUSSION

Increased mastery of concrete operations was evidenced by all three groups during the course of the study, except for the high cognitive group which had achieved the maximum level3 of performance on the measures by the end of first grade (see Table 1). The low cognitive group never caught up

Table 1

Cognitive Development of the Three Groups Over Three Years

	LOW			MODERATE			HIGH		
	KD	1st	2nd	KD	1st	2nd	KD	1st	2nd
Classification	2.58	3.42	4.83	2.92	3.58	5.73	5.33	6.00	6.00
Conservation of Mass	7.83	16.17	27.08	8.25	20.00	30.00	27.00	30.00	30.00
Conservation of Weight	5.33	11.67	21.00	6.42	18.33	25.00	16.58	30.00	30.00

with the high cognitive group and, in fact, their cognitive development at the end of the second grade was not significantly greater than that evidenced by the high cognitive group at the end of kindergarten. The intermediate cognitive group remained ahead of the low group and by the end of second grade achieved a level of cognitive functioning comparable to that achieved by the high group at the end of first grade. In general then, the differences in cognitive functioning evidenced between the three goups in kindergarten remained relatively constant through both first and second grade. A very similar pattern of development was found for social development (see Table 2).

Table 2

Social Development of the Three Groups Over Three Years

	LOW			MODERATE			HIGH		
	KD	1st	2nd	KD	1st	2nd	KD	1st	2nd
Communication	7.50	11.17	11.83	9.00	12.67	13.17	11.83	12.83	14.50
Empathy I	28.75	31.50	31.83	30.42	32.08	32.58	31.83	32.58	32.42
Empathy II	24.50	30.00	30.92	24.83	29.25	30.42	30.25	32.00	32.25
Role-Taking	7.92	8.55	9.21	7.06	8.75	9.08	8.25	9.12	9.58

Support for the major hypothesis was evidenced each of the three years during which the study was conducted. Concrete operational kindergarteners evidenced significantly ($p < .05$) more advanced social development on all but the role-taking task, which still differentiated in the predicted direction. By the end of first grade, differential performances on all four social tasks were still in the expected direction. The differences were significant ($p < .05$) on both empathy measures and approached significance ($p < .10$) on the communication task. In the third year of the study, all differences were still in the expected direction. Performance on the revised empathy measure and on the communication task were significant ($p < .05$), but only approached significance ($p < .10$) on the other two tasks. In summary, then, the social development of the high cognitive group exceeded that of the low cognitive group on all twelve comparisons (4 tasks X 3 years). Seven of these differences were statistically significant and three more approached significance.

In none of the twelve comparisons was the performance of the intermediate group significantly greater than that of the high cognitive group nor significantly lower than that of the low cignitive group. On two of the tasks (revised empathy and communication), the performance of this intermediate cognitive group more closely resembled that of the low cognitive group during all three years of the study. On the two remaining tasks (empathy and role-taking) the social performance level of the intermediate cognitive group lay midway between that of the two more extreme groups during the first year of the study. However, during the last two years of the study their performance more closely resembled that of the high cognitive group.

The present study found substantial evidence for the assumed relationship between cognitive and social development. This relationship was found to be stable from kindergarten through second grade. This pattern of findings is clearly consistent with Piaget's (1950) notion that parallel structural development exists in children's cognitions about the impersonal and interpersonal realms.

The present findings indicate that cognitive and social differences present in kindergarten remain at least until the end of second grade. This further implies that children who are cognitively behind in kindergarten will also be behind in many important social skills and that this relative disadvantage will continue. Consequently intervention programs designed to facilitate social development might be well advised to also attend to cognitive development.

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Footnotes

[1] Paper presented at the meeting of the American Educational Research Association, San Francisco, April, 1976.

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[3] Due to subject mortality over the 2 years of the study only data from 12 children in each of the three groups was analyzed. However, there were no differences between these findings when compared to the analysis of data from all 45 children during Kindergarten.